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Do Mothers Matter? A Comparison of Models of the Influence of Mothers' and Fathers' Educational and Occupational Status on Children's Educational Attainment[★]

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Abstract. The first objective of this article is to clarify which model best captures the structure and trend of the influence of social origin on children's education. The second objective is to analyse how general conclusions on historical trends in educational reproduction change if we add the mother's status background to the model. Six contrasting hypotheses are derived from the body of literature dealing with models on families' socioeconomic status. All hypotheses are translated into empirical models and their explained variance is compared. A pooled data set is used that contains data from the Netherlands, West Germany, and the USA. The Modified Dominance Model, that distinguishes the influence of the highest from the lowest status parent, has the best model fit. Regarding the second objective we see that adding the mother's influence to that of the father's does not change general conclusions on trends in educational reproduction. Over time the influence of both parents decreases continuously. However, the influence of the mother's education and occupational status on children's educational attainment is substantive.

Key words: families, historical trends, social inequality, status attainment

1. Introduction

One of the assumptions often made in mainstream stratification research is that the father's socioeconomic background sufficiently represents his family's socioeconomic position. His status is assumed to determine his family's socioeconomic resources. Much of this argument is based on the fact that mothers often do not hold a paid job or, when employed, are married to a higher status husband (e.g., Goldthorpe, 1983). However, times have changed. A growing number of mothers are employed at one point or another, and the number of cases where the wife's edu-

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cation or occupational level is equal to or higher than her husband's has increased as well (Korupp, 2000). Therefore, in order not to overestimate the influence of the father in social stratification models and underestimate total family influence, it might be advisable to also consider the mother's socioeconomic status.

The first issue at hand is not only *whether* the mother's socioeconomic status (SES) needs to be included but also *how* mother's and father's SES contribute to the educational attainment of their children. In the literature several models have been proposed, suggesting various appropriate measures (e.g., McDonald, 1977; Goldthorpe, 1983; Erikson, 1984; Acock and Yang, 1984; Boyd, 1989; Sørensen, 1994; Van Berkel, 1997). All these models have different underlying theoretical approaches for the measurement of social origin and all of them lead to different empirical models. In this article a basic ranking order will be established for the appropriateness of these theoretical and empirical concepts for modelling the influence of social origin.

Secondly, by taking advantage of the fact that the same information on the mother's as on the father's status background is included in our model comparison, it is possible to study whether conclusions on historical trends in status attainment are still valid, if the influence of the mother is considered as well. Research including only the father's SES has generally shown that his influence on children's status attainment has been reduced during the recent decennia (Ganzeboom and De Graaf, 1983; Rijken, 1999). For the Netherlands, other studies show that the influence of the mother, compared with the father, increases until well into the 1990's (Bakker and Cremers, 1994; Van der Lippe et al., 1995). One obvious explanation is that the mother is starting to take over the role of the father in the process of status attainment. Also, if the influence of the mother's education is considered, the decrease of the influence of the father's SES is less dramatic (Van der Lippe et al., 1995). Previous research in the Netherlands and the USA suggests that the influence of the mother's occupation, too, is non-trivial for the educational success of her children (Dronkers, 1995; Kalmijn, 1994). Although these studies show that the influence of the mother's occupational status on children's education is substantial, they do not show how the influence of the mother's occupation has developed historically.

Because the magnitude of parental status transfer changes throughout history and as parents' educational levels and occupations influence children's education, it is crucial to model both of these dimensions simultaneously. The aim of the present article is to produce a test to decide which theoretical approach produces the most appropriate empirical model to explain children's educational attainment over time. We use data from three Western industrialized countries – the USA, West Germany, and the Netherlands – to study whether we achieve a better explanation of the child's educational attainment if, in addition to the father's background, we also consider the mother's SES. The issues here are thus twofold, the first being a basic methodological problem, and the second an empirical issue of the inclusion of the mother's SES for predicting children's educational attainment over time. As the children's education is a crucial element in their later career chances, the

influence of social origin is analysed for this level of their status attainment. The research questions answered are as follows:

- (a) What is the most appropriate model to study how the mother's, in relation to the father's, socioeconomic status has influenced children's educational attainment over recent decades?
- (b) How do conclusions about less educational reproduction change if, in addition to the father, the influence of the mother's socioeconomic status is also considered?

2. Theory and Hypotheses

2.1. THE 'CONVENTIONAL' VIEW

Until the early 1980's studies in social stratification mainly followed a model, which Goldthorpe (1983) has labelled the 'conventional view'. Within the conventional view, class positions of families are established by including the resources of the father only (Goldthorpe, 1983, 1984). This practice is based on the theoretical perspective that life chances are derived from the primary context of children's development: the family. The conventional view assumes that the mother's non-employment is part of the family strategy. However, many married women have, at some time or another, spells of employment. According to the conventional view, however, wives continue to be dependent on their husband's socioeconomic achievement for the greater part of their life. Therefore, only his status background determines the social and economic status of the family – or does so to an overwhelming extent. In summary, the conventional view leads to the expectation that *only the father's* education and occupational status background determines the educational attainment of his children. The mother's status background has no additional influence (*Conventional Hypothesis*).

2.2. THE DOMINANCE OR POWER MODEL

The Conventional Model coincides with a Weberian view that classes form the encompassing category for members who share similar market and work conditions. Erikson claims that these conditions have "[...] consequences also for the consumption level and housing standard, for the way in which children are brought up and the education they are provided with, as well as value commitments" (Erikson, 1984, p. 501) – consequently ruling every aspect of the child's life. However, Erikson relaxes the assumption that we can derive all status positions, consumption levels and housing standards of the family from the father's status. The 'Dominance Model' he proposes holds that the member of the household with the *highest* socioeconomic status determines the status position of the family. He nevertheless implies that usually the father holds the highest status position. However, if the mother has a higher status occupation, he proposes that she should form the basis of the analysis (Erikson, 1984). The Power Model, proposed earlier by McDonald

(1977) is similar to the dominance approach. Its assumptions are that a parent's educational and occupational status relates to his or her power position within the family and that children are oriented towards the more powerful parent. It then follows that the less powerful parent has not much salience for the upbringing of the children. The idea of status dominance, whether it is by the mother or the father, implies that it is sufficient to consider only the parent who holds a higher status position to cover the socioeconomic status of children's background (*Dominance Hypothesis*).

The theoretical notion of status dominance, though, can be interpreted in another, less strict fashion. According to Garnsey (1978), the contribution of the resources of the lower status parent remains vital in some families, in particular, those with an unskilled or manual head of the household. Garnsey (1978) formulates this assumption regarding the consumption level of families. In a way, children's educational attainment can be viewed as a sort of consumption of parental resources. The exclusion of the non-dominant parent in the 'Dominance Model' may thus present a theoretical misrepresentation of the entire scope of parental resource transfer. To test this assumption, we propose to relax the theoretical idea of 'dominance'. If the influence of the lower status parent is considered too, then it follows that: it does not suffice to consider only the parent with the higher status position to cover the status background of children, because the lower status parent contributes to the transfer of parental resources to children (*Modified Dominance Hypothesis*).

2.3. THE JOINED MODEL

As, in general, women are steadily increasing their lifelong attachment to the workforce, Sørensen (1994) challenges whether it suffices for (future) analysis on status attainment to base the SES of the family on one member of the family only. Reviewing the major studies that deal with the question of whether or not the exclusion of women's social class artificially homogenizes the class position of families, she concludes that "[t]he bias is not large, but it is nonetheless there" (p. 45). She opts to use a 'joined classification', an approach based on Graetz (1991) who reinvestigated Erikson's (1984) idea to build 'contrast groups' for the classification of cross-class families. This approach takes into account the distance of SES between the two parents. The assumption is that if parents' status positions differ from each other, children tend to be intermediately positioned between their father and their mother's status position. Some qualitative analysis has pointed out that in families where the mother holds a (much) higher job status than the father, the lower ambition of the father acts as an opposing force to the achievement orientation of the children (McRae, 1986). The joined classification model allows for these differences to be accommodated by constructing an average status of fathers and mothers. The leading hypothesis for this model is that the *average* parental

education and occupational status presents the SES background of the child most adequately (*Joined Model Hypothesis*).

2.4. THE SEX-ROLE MODEL

The Sex-Role Model assumes that daughters are oriented towards mothers and sons are oriented towards fathers. This same-sex orientation pattern may emerge because of the expert power of the same-sex parent as perceived by the children (Acock and Yang, 1984; Boyd, 1989). Research on how sex-roles are transferred from one generation to the next confirms that children have a strong same-sex orientation (Smith and Self, 1980; Starrels, 1992). In many ways sons and daughters take their same-sex parent as a sex-role example for themselves (e.g., Huttunen, 1992; Updegraff et al., 1996). Here the leading hypothesis is that compared with the father the mother's educational and occupational status is important only for the daughter and compared with the mother, the father's socioeconomic influence is important only for the educational attainment of the son (*Sex-Role Hypothesis*).

2.5. THE INDIVIDUAL MODEL

Through increased female labour market participation mothers have gained not only financial resources but also have tilted the authority relations within the family away from the father, towards the mother (Lopata, 1994). The assumption here is that the mother has increased her influence at home regarding crucial questions on, for instance, where the child ought to go to school and how long s/he should attend school. The approach assumes that it is the contribution of each parent individually that influences the educational success of the children. Accordingly, their attributes should be considered on an individual basis. This concept has become known as the individual model (Acker, 1973; Erikson and Goldthorpe, 1993; Sørensen, 1994). Here the hypothesis is that *both* the mother's and father's statuses influence the educational attainment of their children (*Individual Hypothesis*).

3. Data and Methods

3.1. DATA

Data for three western industrialized countries are used to compare the outcomes of the models proposed above: the Netherlands, West Germany, and the United States. The USA is represented by the first wave of the National Study of Families and Households (NSFH). The NSFH is a national multistage area probability sample. The survey for the wave we use here was completed in 1988. The design of this study is cross-sectional, though it has several retrospective sequences (Sweet et al., 1988a, 1988b). The German Life History Study (GLHS) represents West Germany, as only respondents from West Germany entered the sample. This selection insures that the economic conditions in which the respondents have grown up

Table 1. Ranges, means and standard deviation of the variables in the analysis

Abbreviation	Contents	Ranges	Means	SD	Comments
FEM	Male/Female	0/1	0.52		Respondent's sex
BYR	Year of birth	0.0–1.0	0.65	0.27	Rescaled from 1923–1962
FIS ^a	Father's ISEI	1.0–9.0	4.20	1.60	ISEI divided by 10
MIS ^a	Mother's ISEI	1.0–9.0	4.10	1.54	ISEI divided by 10
EDU	Respondent's education	1–19	12.30	3.01	Years of education
FED ^a	Father's education	1–19	10.30	3.60	Years of education
MED ^a	Mother's education	1–19	9.80	3.13	Years of education
HOM	Mother is a homemaker	0/1	0.42		No occupational code for the mother

Source: NSFH 1988; GLHS 1983, 1989; FAM 1993; HIN 1995.

^aSeveral abbreviations of these variables are used to express their different operationalizations in the models; for an overview on the abbreviations for the influence of social origin used in the models, see appendix B.

remain comparable to the other two countries. The first survey of the GLHS that we use contains life course information for the birth cohorts 1929–31, 1939–41, and 1949–51 and was completed in 1983 (Mayer and Brückner, 1989). Information on two more cohorts was added in 1989, when respondents born between 1954–56 and between 1959–61 were surveyed (Brückner and Mayer, 1995). Together it is a representative probability sample with an explicit cohort sampling design. For the Netherlands we match two household surveys, the Netherlands Family Survey 1992–1993 (FAM) and the Households in the Netherlands 1995 (HIN). Both studies contain stratified random national samples of the Dutch population. It is important to notice that the three countries are used as replicates. This implies that, although our model allows for differences regarding educational expansion at the national level, cross-national differences in status attainment are neither studied nor interpreted. The databases are weighted in all four sets of data.

For all countries the parents and the respondents' educational and the parents' occupational backgrounds are surveyed. For the sake of comparability, the analysis is limited to respondents born between 1923 and 1962 with a valid entry for their final educational level. The educational attainment of the child was measured in years. In the data from the USA, the respondent's and the parents' educational level were already coded into years of education. For the Netherlands and Germany a year-proxy variable¹ measures the educational level of the parents and the respondent (see Appendix A). The mother and the father's occupational status are scaled by the 'International Socioeconomic Index of Occupational Status' (ISEI) (Ganzeboom, De Graaf and Treiman 1992).

The ranges, means and standard deviations of the respondents' and their parents' education and occupational status are displayed in Table I. The educational level of the respondents, averaged over three countries, is higher than the educational level of their parents. The father's education is higher than the mother's. Only in the USA does the average educational level of the mother exceed that of the father (table not shown).

Of all mothers in the data, 42% were homemakers, with no occupational code of their own. The highest percentage of homemakers is found in the USA, with 49%. Germany and the Netherlands have approximately half as many homemakers with 26%, respectively, 24% (table not shown). This between-country variance is due to the way respondents were asked about the occupational title of the mother. The surveys in Germany and the Netherlands contained a question about the occupation of the mother when the respondent was 14–16 years old. If the mother had not worked during that time, the surveys in Germany or in the Netherlands contained a second question, asking what occupational title the mother held before she quit the labour market or before her marriage. The survey in the USA included only a single question on the mother's occupation (while the respondent was under 18 years old). When excluding parents without a valid entry on their educational and occupational background 7559 valid cases remain, 3583 from the USA, 2092 from Germany, and 1884 from the Netherlands. Otherwise, when including homemakers, 13148 valid cases remain for the analysis, of which 6552 are from the USA, 3468 from Germany, and 3128 from the Netherlands.

We perform the analysis both excluding and including the group of homemaking mothers. Because homemakers do not hold an occupational title of their own, we exclude them in the first step. Nevertheless, it may be that they exert a separate influence and therefore, in a second step, they are included. Whenever homemaking mothers enter the model, the country-specific mothers' mean ISEI value substitutes the missing value for the occupational status of homemakers. Simultaneously her effect is controlled by a dummy variable (Cohen and Cohen, 1975, pp. 274). To analyse trends over time, we include the year of birth of the respondent as a linear trend, but rescale it to range between zero and one. The interaction term shows how the influence of the mother and the father has developed for the most recent cohort, while the mother's and the father's main effects refer to their influence in the oldest cohort.

3.2. MODELS AND FIT MEASURES

The hypotheses have to be operationalized in order to be tested. Table II shows the abbreviations, contents and range of the variables in the analysis and offers a short model description. The various operationalizations of the mother's and the father's SES are indicated by the name of the variable. Every model includes an interaction between the main parental status variable and the respondent's birth year to model the historical trends of parental status transfer. These interactions are indicated by

a star (*). Note that whenever an interaction enters the model, it is implicit that the main effects are also included in the model. In some of the models, equality constraints are applied to the main effects or historical trends for the mother's and the father's influence. Equality constraints imply that the influence of a variable is identical to that of the other variable to which it is set equal. If equality constraints are applied, they are indicated by a mathematical equality sign (=).

All hypotheses are estimated in three steps. The set of models (A) comprises a comparison regarding the influence of parental *education* on the children's educational background. The set of models (B) is a comparison analysing the influence of parental *occupational status* on children's education. The set of models (C) combines the sets of models (A) and (B) and analyses the influence of the educational *and* occupational level of the parents. The analyses were carried out in this fashion in order to study whether the patterns of influence of parental education differ from the influence of parental occupational status. The baseline model ('B₀' in Table III through VI) controls, in a three-way interaction, the effects of respondents' birth year (BYR), country (CNR), and gender (FEM).

The empirical estimation of the Conventional Model is the most straightforward. We simply measure the size of status transfer throughout history by the father's socioeconomic background (1). However, here we also show what happens if, instead of the father, we use the mother's SES to cover the influence of social origin (2).

The Dominance Model is also estimated in various ways. First, only the historical trend of the influence of the dominant parent, i.e., the parent with the highest status background, is estimated (3). By contrast, also for the non-dominant parent, the parent with the lowest status background, the historical trend of status transfer is calculated (4).

To operationalize the Modified Dominance Model, we allow the influence of the dominant *and* non-dominant parent to enter the model simultaneously (5). In a second step, the main effects of the highest and the lowest status parent are modelled separately, but equality constraints are applied to their historical trend (6).

The Joined Model has only one model variation. The main effects of the father's and the mother's SES and also the historical trend are constrained to be equal. The results of this model is the average impact of the mother and the father (7).

The operationalization of the Sex-Role Model results in four empirical models. The first model includes the effects of only the same-sex parent (8). As a contrast the second model uses only the influence of the different-sex parent (9). The third model simultaneously includes the influence of the same-sex and the different-sex parent (10). The fourth model constrains the historical trends of the influence of the same-sex and the different-sex parent to be equal (11).

The implementation of the Individual Model allows two sorts of models. The first model uses the influence of the mother's and the father's educational and occupational background and their historical trends to predict the child's education

Table II. Empirical models for the comparisons of how parents' SES influences children's education

Definition	Model ^a		
	No.	Parents' Education (P.E.) (A)	Parents' Occupation (P.O.) (B) PE. & P.O. (C)
Baseline Model	(0)	BYR*FEM*CNR ^b	
Father's (or mother's) SES represent parental SES	(1)	<i>Conventional model:</i> (0) +FED*BYR	(A1) + (B1)
	(2)	(0) +MED*BYR	(A2) + (B2)
Highest or lowest parent represent parental SES	(3)	<i>Dominance Model:</i> (0) +HS_ED*BYR	(A3) + (B3)
	(4)	(0) +LS_ED*BYR	(A4) + (B4)
Highest and lowest parent represent parental SES	(5)	<i>Modified Dominance Model:</i> (3) +LS_ED*BYR	(A5) + (B5)
	(6)	(5) +HS_ED*BYR=LS_ED*BYR	(A6) + (B6)
Father's and mother's SES are set equal to each other	(7)	<i>Joined Model:</i> (0) +FED*BYR = MED*BYR	(A7) + (B7)
Same-sex and/or different-sex parent represent parental SES	(8)	<i>Sex-Role Model:</i> (0) +SS_ED*BYR	(A8) + (B8)
	(9)	(0) +DS_ED*BYR	(A9) + (B9)
	(10)	(8) +DS_ED*BYR	(A10) + (B10)
	(11)	(10) +SS_ED*BYR = DS_ED*BYR	(A11) + (B11)
Father's and mother's SES represent parental SES	(12)	<i>Individual Model:</i> (0) +FED*BYR + MED*BYR	(A12) + (B12)
	(13)	(12) +FED*BYR = MED*BYR	(A13) + (B13)

^aFor an explanation of the abbreviations used see appendix B.^b If an interaction effect is used, it is implicit that the main effect is also included in the model.

(12). All four of these effects are measured separately. In a second instance, the historical trends of the mother's and the father's influence are set equal to each other, whereas their main effects are still measured separately (13).

Stata's constrained linear regression models (CLR), that allow for effects to be set equal to each other, are used to estimate the models. In order to conclude which model offers the best estimation of the effect of the mother and the father on the educational attainment of their child two comparative statistics are used. First, as proposed earlier by Erikson (1984), the amount of explained variance, the adjusted R^2 , is a good fit measure, although not a formal test for significant differences. The adjusted R^2 corrects the explained variance in the model by accounting for the degrees of freedom used. An increase of the adjusted R^2 always implies a better fitting model. Secondly, the models 'sum of squares' (SS Model) are compared. The model with the highest sum of squares, taking into account the degrees of freedom (DF) used, performs best of all. We can establish a ranking order of the models by using the following F-test,

$$\frac{(\text{SS Model}_A - \text{SS Model}_B)/(\text{DF}_A - \text{DF}_B)}{\text{MS}_{\text{err}}} > 3.84,$$

where model_A is the one with the higher number of degrees of freedom used. If the number in the denominator is roughly four times as large as the numerator, model_A performs better than model_B. Otherwise model_B is the preferred model, because it is more parsimonious. The mean squared error (MS_{err}) is taken from the best fitting model. This test statistic is used as a rough indicator to compare non-nested models as well.

4. Results

4.1. MODEL COMPARISONS

Table III contains the results of our model comparisons. The observed sum of squares and adjusted R^2 give an indication of the model fit of the models (A), (B), and (C). The above described F-test is used for indicative purposes only, to establish a ranking order for the fit of the models. As homemaking mothers hold a school degree but no occupational title, their exclusion leads to a decrease in the number of cases in the set of models (B) and (C), compared with the number of cases in the set of models (A).

First of all, we look at the results of the influence of the educational parental background on the educational attainment of the children. The two models are derived from the *Conventional Hypothesis*. Comparing model (A1) and (A2) we see that it is far better, when using the Conventional Model, to include the father's education rather than the mother's education. Note that for the influence of both the mother's and father's education separately, there is clear evidence of a downward trend towards less educational reproduction throughout time (model A1 and A2).

Model (A3), the Dominance Model, considers only the highest parental SES while neglecting the influence of the lower status parent's SES. It performs better than the Conventional Models. Yet, although superior to the Conventional Model (A1, A2), most of the other models in this table fit the data better. When we compare the fit statistics for the influence of the dominant parent (A3) with the non-dominant parent (A4), the former explains far more variance than the latter.

By comparing the Modified Dominance Model (A5) with model (A3) we observe that it is best to consider the influence of both the highest and the lowest parental SES. It is even better, however, to use the Modified Dominance Model and constrain the historical trends of status transfer to be equal for the dominant and non-dominant parent (A6). This model uses the smallest number of degrees of freedom compared to its sum of squares and also has the highest explained variance.

The performance of the Joined Model (A7) suggests that it is also a good solution if we jointly model the impact of the education of the father and the mother on the education of their child. It proves to be superior to the Conventional Models (A1, A2) and the Dominance Models (A3, A4), but not to the Modified Dominance Models (A5, A6).

The increase of explained variance by using a constrained historical trend variable ($FED*BYR = MED*BYR$) in the Modified Dominance Model and the Joined Model suggests that the influence of the mother's and the father's education have developed in a similar fashion throughout time. For the following models we will see that if this restriction is used, it will always improve the model fit.

When using only the influence of the same-sex parent as in the Sex-Role Model (A8) the model performs worse than the Conventional Model that considers only the influence of the father (A1). Obviously, there is little evidence of a same-sex orientation of children, regarding their educational attainment. However, the Sex-Role Model including the different-sex parent (A9) performs even worse than the Sex-Role Model including the same-sex parent (A8). On the other hand, the Sex-Role Model performs better than the Conventional Model if we consider the influence of both the same- *and* the different-sex parents, as in model (A10). In comparison with model (A10), the fourth Sex-Role Model (A11) shows an even better fit. In model (A11) the historical trend of parental influence is constrained to be equal between the two parents. As mentioned before, this constraint invariably improves the model fit significantly.

Finally, we look into the Individual Model, that is often used in research on status attainment (e.g., Treiman and Terrell, 1975; Van der Lippe et al., 1995). Model (A12) measures the influence of the mother's and the father's education and both of their historical trends separately. Compared to the Conventional Model (A1), the Individual Model (A12) has a significantly better fit, showing that the influence of mother's education is important for explaining the educational attainment of children. Again, however, it is even better to constrain the historical trends

Table III. A comparison of models on the effects of social origin over time, on children's educational attainment (fit statistics)

Models		DF			Sum of squares			Adjusted R ²				
No.	Parents' Education (P.E.)	Parents' Occupation (P.O.)	P.E. & P.O.	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
(A)	(B)	(C)										
<i>Baseline</i>												
(0)	BYR*FEM*CNR			11	11		18849	9730	9730	0.1564	0.1508	0.1518
<i>Conventional Model</i>												
(1)	(0) +FED*BYR	(0)	(A1) + (B1)	13	15		37306	15587	18502	0.3103	0.2438	0.2896
(2)	(0) +MED*BYR	(0)	(A2) + (B2)	13	15		34647	14580	17450	0.2881	0.2280	0.2730
<i>Dominance Model</i>												
(3)	(0) +HS_ED*BYR	(0)	(A3) + (B3)	13	15		39902	16500	19706	0.3320	0.2582	0.3085
(4)	(0) +LS_ED*BYR	(0)	(A4) + (B4)	13	15		34584	15860	18172	0.2876	0.2481	0.2843
<i>Modified Dominance Model</i>												
(5)	(3) +LS_ED*BYR	(3)	(A5) + (B5)	15	19		40760	17367	20256	0.3391	0.2717	0.3168
(6)	(5) +HS_ED*BYR = LS_ED*BYR	(5)	(A6) + (B6)	14	17		40760	17364	20255	0.3391	0.2717	0.3170
<i>Joined Model</i>												
(7)	(0) +FED*BYR = MED*BYR	(0)	(A7) + (B7)	13	15		40152	17359	20071	0.3341	0.2717	0.3143
<i>Sex-Role Model</i>												
(8)	(0) +SS_ED*BYR	(0)	(A8) + (B8)	13	15		36434	15207	18149	0.3031	0.2338	0.2840
(9)	(0) +DS_ED*BYR	(0)	(A9) + (B9)	13	15		35410	14951	17777	0.2945	0.2338	0.2780
(10)	(8) +DS_ED*BYR	(8)	(A10) + (B10)	15	19		40170	17363	20081	0.3342	0.2716	0.3141
(11)	(10) +SS_ED*BYR = DS_ED*BYR	(10)	(A11) + (B11)	14	17		40174	17363	20080	0.3342	0.2717	0.3142
<i>Individual Model</i>												
(12)	(0) +FED*BYR + MED*BYR	(0)	(A12) + (B12)	15	19		40176	17389	20119	0.3342	0.2720	0.3146
(13)	(12) +FED*BYR = MED*BYR	(12)	(A13) + (B13)	14	17		40174	17387	20094	0.3342	0.2721	0.3145
MS _{err}							6.07	6.07	5.77			
N							13148	7559	7559			

Source: NSFH 1988; GLHS 1983, 1989; FAM 1993; HIN 1995.

of the parents' influence to be equal to each other, as done in the second Individual Model (A13).

Overall, the best model we observed was the Modified Dominance Model. The higher status parent explains more of the variance of children's education than the father's background only. We can see this by comparing the outcome of the Conventional Model that uses the father's status (A1) with the Dominance Model, that uses the dominant parent's status (A3). However, in contrast to what Erikson believed, the lower status parent still has a significant influence on children's education.

We observe this by comparing the Modified Dominance Models (A5) and (A6) with the Dominance Model (A3). Perhaps the additional influence of the non-dominant parent indicates how vital in most families the additional resources, which a second parent contributes, are. This specification is also superior to the one chosen for the Individual Model.

The set of models (B) analyses how the parents' occupational level influences the educational level of their child. The degrees of freedom are the same as in the set of models (A). On average, the statistical relationship between parents' and children's education is stronger than the relationship between parents' occupational status and children's education. The overall explained variance of children's education by parents' occupational status now is smaller than in the previous analysis, in the set of models (A).

The Modified Dominance Models (B5, B6), Sex-Role Models with both parents' occupational status (B10 and B11) and the Joined Model (B7) fit the data rather well. They are outperformed by the two Individual Models (B12, B13). The best Individual Model is the one that puts an equality constraint on the historical trend of parents' occupational influence (B13). Note that, when we take into account the degrees of freedom used in the models, the differences of the fit statistics between the Modified Dominance Model (B6) the Joined Model (B7), and the Individual Model (B13) are very small.²

It becomes clear that the influence of parental education differs from the influence of their occupational level on their children's education. Both, parents' education and occupation are significant for the explanation of children's educational attainment. The influence of parental *education* can best be studied with the Modified Dominance Model, that is, sorting them by a dominant versus non-dominant category (A6). The *occupational* influence of parents can best be studied by entering the father's and the mother's occupation into the equation as done in the Individual Model (B13).

The influence of either parents' characteristics develops in a similar fashion over time. It always improves the model fit significantly if we constrain the historical trends so that the influence of the father's and mother's status are equal. This has been the case for all the model variations in the sets of model (A) and (B).

Excluding the influence of parents' occupational level on children's education has the disadvantage of underestimating the total scope of intergenerational status

transfer. Therefore, in model (C) we study the impact of parents' educational and occupational level together. Initially, this means that the results of model (C) are restricted to the population of respondents whose parents both have valid entries for their occupational codes ($N = 7\,559$).

The outcomes of models (C) are comparable to the results of models (A) but not models (B). As could be expected, the explained variance in the models increases when the occupation of the parents is added. The Conventional Models (C1, C2) again perform unsatisfactorily. Throughout the set of models (A) to models (C) we have seen that the Conventional Model exhibits the poorest performance. Only for the model where merely the different-sex parent's status background enters the model does the model fit appear to be worse (A9, B9, C9). The Conventional Model does not recommend itself to be used, but neither does the Sex-Role Model. The Dominance Model that uses only the higher status parent (C3) is outperformed by a variety of other models, such as the Modified Dominance Model, the Joined and the Individual Model. In conclusion, the data supports neither the *Conventional*, nor the *Dominance*, nor the *Sex-Role Hypothesis*.

Altogether, taking into account both parents' SES improves the fit measures in all models (C) significantly. The joined classification (C7) offers a good, parsimonious solution. It fits better than any of the other models, apart from the Modified Dominance Model (C5 and C6). Clearly, the Modified Dominance Model (C6) that includes a joined measurement of parents' historical effects, has the best fit. Overall, the historical trends of the influence of parental educational and occupational status are displayed best when they are constrained to be equal for the father and the mother, so to speak as their 'joined trend'.

The Individual Model (C12, C13) beats the Conventional, Dominance and Sex-Role Models, but is outperformed by the Joined (C7) and the Modified Dominance Model (C6). If only the influence of the parents' occupational status on children's educational level is considered, then the Individual Model displays the best model fit. Thus the claims of the *Individual Hypothesis*, that the influence of the mother's and the father's occupational statuses count separately, cannot entirely be dismissed.

4.2. THE SIZE OF PARENTAL STATUS TRANSFER

The relationships become clearer if we look at the strength and the size of coefficients for the models. In Table IV a subset of the models (C) are selected and their coefficients shown. The selection of models is based upon a choice of the best model from the six model variations. For model (C2) we have made an exception, as it explicitly focuses on the influence of the mother. Furthermore, we also show the results of the Individual Model (C12) because it offers a textbook example on how collinearity can distort results.

The selected models are, first of all, the two Conventional Models, which include only the father's background (C1), or the mother's background (C2) and the

Modified Dominance Model (C6). Furthermore, we show the coefficients for the Joined Model (C7). Also the coefficients of the Sex-Role Model (C11) and the two Individual Models (C12, C13) are displayed. The question is, how does the size and the historical pattern of the parental influence depend on the way their influence is modelled, i.e., by the father's, mother's, by the dominant/non-dominant parent's, by their joined, by the same-sex/different-sex or by their individual influence?

The size of the coefficients of model (C1) and (C2), the two conventional models, suggests that the father's and the mother's occupational level are both important for the explanation of the child's educational level. Yet, the importance of social origin, be it the father's or the mother's SES, is becoming less and less determining for the educational attainment of children. Both parents' influences decrease rapidly throughout the decennia.

The most prominent pattern discovered is that the influence of the parental education has a "modified dominance" pattern. Model (C6) allows for this power structure of parental influence. The influence of the higher educated parent is more pronounced than the influence of the lower educated parent. We find no dominance pattern for the influence of parental occupations. The influence of the lower status parent is slightly higher than the influence of the higher status parent.

Model (C7) jointly estimates the entire influence of social origin and historical trends. The model does not allow for comparisons between parents, but for studies that aim to capture total parental influence this model is sufficiently elaborated.

In the sixth column the size and strength of the coefficients of the Sex-Role Model (C11) are shown. The influence of the same-sex parent is only slightly higher. Therefore, the coefficients do not suggest that sex-role imitation is the main pattern for parental status transfer onto children's education.

When modelling, as done in model (C12), both parents' background and historical status transfer trends individually, collinearity influences the stability and size of the coefficients. This means that the coefficients for the model become unstable, and the individual parent's main effect and trend pattern is distorted. Thus, due to collinearity, the individual model makes it harder to identify any trends of status transfer. The historical trend of parental status transfer is best modelled by constraining the father's and the mother's trend to be equal, as done in model (C6), (C7), (C11) and (C13). By that, part of the collinearity existing between both parents' status background vanishes.

Remember that for the measurement of the influence of parents' occupational status in the set of model (B), the Individual Model (B13) had been the preferred solution. In Table V, which includes the size of the influence of parents' education *and* occupation (set of models C), we see why this is the case. Obviously the influences of the mother's and the father's occupation differ significantly, but not in a way as captured by the Modified Dominance Model.

By now our firm conclusion is that for both parents the influence of their SES background on the education of their child diminishes throughout the years with a

Table IV. Estimated parameters for selected models of Table 3 (models C), T-values in parentheses

	(1)	(2)	(6)	(7)	(11)	(12)	(13)
B ₀	8.73	8.55	7.46	7.55	7.55	7.46	7.54
FED	0.287 (10.6)			0.189 (11.5)		0.144 (4.6)	0.189 (9.8)
MED		0.356 (11.8)		0.189 (11.5)		0.240 (7.0)	0.190 (9.5)
FED*BYR	−0.094 (2.5)			−0.072 (3.1)		−0.005 (0.1)	−0.072 (3.1)
MED*BYR		−0.140 (1.6)		−0.072 (3.1)		−0.148 (3.1)	−0.072 (3.1)
FIS	0.510 (8.2)			0.300 (7.9)		0.400 (6.2)	0.332 (8.0)
MIS		0.391 (6.2)		0.300 (7.9)		0.202 (3.1)	0.267 (6.4)
FIS*BYR	−0.282 (3.3)			−0.126 (2.4)		−0.224 (2.6)	−0.126 (2.4)
MIS*BYR		−0.143 (3.3)		−0.126 (2.4)		−0.032 (0.4)	−0.126 (2.4)
HS_ED			0.259 (12.6)				
LS_ED			0.116 (5.5)				
HS_ED*BYR			−0.068 (2.9)				
LS_ED*BYR			−0.068 (2.9)				
HS_IS			0.281 (6.3)				
LS_IS			0.314 (6.6)				
HS_IS*BYR			−0.132 (2.5)				
LS_IS*BYR			−0.132 (2.5)				
SS_ED					0.196 (10.0)		
DS_ED					0.183 (9.5)		
SS_ED*BYR					−0.071 (3.1)		
DS_ED*BYR					−0.071 (3.1)		
SS_IS					0.314 (7.5)		
DS_IS					0.286 (6.8)		
SS_IS*BYR					−0.126 (2.4)		
DS_IS*BYR					−0.126 (2.4)		
Adj. R ²	0.310	0.288	0.339	0.334	0.334	0.334	0.334
DF	15	15	17	15	17	19	17

Note: Effects from the baseline model (B₀) are omitted. Intercept refers to women in the USA born in 1923.

Source: NSFH 1988; GLHS 1983, 1989; FAM 1993; HIN 1995.

similar pattern. In the next section we will include homemaking mothers again into our database and look at the results for the entire population in the database.

4.3. A COMPARISON OF MODELS INCLUDING HOMEMAKING MOTHERS

By selecting only mothers with a valid occupational code, in models (C) roughly 43 percent of the respondents are excluded from the analysis. In model (D), shown in Table V, we also consider the influence of homemakers. Remember that the variable for the influence of the homemaking mothers was coded as a dummy variable, while simultaneously using a mean substitution for their value on the variable for the mother's occupational status. The baseline model of Table V includes the same variables as in Table III, plus an interaction between homemakers and country. For this last step we display only the results of the previously best fitting models. This means that we show the outcomes of the Modified Dominance Model (D6), the Joined Model (D7) and the Individual Models (D12, D13).

Besides showing the fit statistics for the model comparisons, Table V shows the results for an additional model. The new model accounts for the fact that homemaking mothers have only educational resources to transfer to their children. Model (D13a) introduces an interaction effect (HOM*MED) that allows the education of a homemaking mother to weigh stronger than the education of a mother who had a paid job.

The results in Table V show that the model with the interaction for homemaking mothers (D13a) fits the data better than any other. Thus, the educational background of the mother becomes more important for her child's educational attainment if she is a homemaker, compared to the effect of the education of an employed mother. If we add this interaction to other models (B or C), it also improves the model fit. Nevertheless, our following model comparison is restricted to the models without this interaction.

The results of the remaining models are similar to those in Table III, except that now they have become more crystallized. The Modified Dominance Model (D6) fits the data significantly better than any of the remaining models. A good second best, as has also been the case before, is the Joined Model (D7). Only fourth best is the Individual Model (D12), because it has a similar sum of squares as the Individual Model with constrained historical trends (D13), but uses an additional two degrees of freedom.

4.4. THE SIZE OF PARENTAL STATUS TRANSFER WHEN CONSIDERING HOMEMAKING MOTHERS

In Table VI we show the size of the coefficients of the above selected models from Table V. As homemaking mothers are included, the number of cases in this analysis is again 13148, as in the set of models (A). In the set of models (D) we find that model (D13a), where we additionally allowed the educational background

Table V. Selected model comparison on the effects of social origin throughout time on children's educational attainment (fit statistics, homemakers included)

No.	Models (D)	DF	Sum of squares	Adjusted R ²
<i>Baseline</i>				
(0)	BYR*FEM*CNR + HOM*CNR	14	19312	0.1601
<i>Modified Dominance Model</i>				
(6)	(7) +HS_ED*BYR = LS_ED*BYR+HS_IS*BYR = LS_IS*BYR	20	42549	0.3537
<i>Joined Model</i>				
(7)	(0) +FED*BYR = MED*BYR + FIS*BYR = MIS*BYR	18	42169	0.3507
<i>Individual Model</i>				
(12)	(0) +FED*BYR + MED*BYR + FIS*BYR + MIS*BYR	22	42365	0.3521
(13)	(12) +FED*BYR = MED*BYR + FIS*BYR = MIS*BYR	20	42346	0.3521
(13a)	(13) +HOM*MED	21	42625	0.3543
Ms _{err}			5.92	
N			13148	

Source: NSFH 1988; GLHS 1983, 1989; FAM 1993; HIN 1995.

Table VI. Estimated parameters for selected models in Table V (Models D), T-values in parentheses (N = 13148, homemakers included)

	(6)	(7)	(12)	(13)	(13a)
B ₀	7.46	6.35	6.72	6.63	7.22
FED		0.223 (21.8)	0.199 (9.6)	0.219 (17.3)	0.204 (15.9)
MED		0.223 (21.8)	0.246 (10.7)	0.225 (16.7)	0.158 (9.6)
FED*BYR		−0.070 (4.5)	−0.037 (1.2)	−0.070 (4.5)	−0.054 (3.5)
MED*BYR		−0.070 (4.5)	−0.104 (3.0)	−0.070 (4.5)	−0.054 (3.5)
FIS		0.317 (10.4)	0.405 (9.9)	0.364 (11.5)	0.366 (11.5)
MIS		0.317 (10.4)	0.145 (2.4)	0.211 (5.8)	0.275 (7.4)
FIS*BYR		−0.171 (3.9)	−0.215 (3.6)	−0.150 (3.4)	−0.159 (3.6)
MIS*BYR		−0.171 (3.9)	−0.049 (0.6)	−0.150 (3.4)	−0.159 (3.7)
HOM*MED ^a					0.114 (6.9)
HS_ED	0.300 (21.5)				
LS_ED	0.114 (10.1)				
HS_ED*BYR	−0.068 (4.3)				
LS_ED*BYR	−0.068 (4.3)				
HS_IS	0.295 (8.3)				
LS_IS	0.314 (8.0)				
HS_IS*BYR	−0.168 (3.9)				
LS_IS*BYR	−0.168 (3.9)				
Adj. R ²	0.355	0.352	0.353	0.353	0.355
DF	20	18	22	20	21

Source: NSFH 1988; GLHS 1983, 1989; FAM 1993; HIN 1995.

Note: Effects from the baseline model (B₀) are omitted. Intercept refers to women in the USA born in 1923.

^a The main effects of homemaking mothers on the educational attainment of their children are significantly negative in all three countries.

of a homemaker to weigh more strongly, explained the educational level of the child best. The additional amount of influence a homemaker's education has, compared to an employed mother, is indicated by the size of the coefficient, labelled HOM*MED (0.114).

Regarding the results for model (D6), the main influence of the dominant versus the non-dominant parent's educational level is more dissimilar than the main effects of the dominant versus non-dominant parent's occupational level. Obviously, the dominant parent's education contributes more to the explanation of the child's education than the non-dominant parent's education. This is not the case for the influence of the parents' occupational level. The difference in influence between the dominant parent's occupation and the non-dominant parent's occupation is small.

Remember that the historical trends of the influence of both parents are constrained to be equal in model (D6), (D7), (D13), and (D13a). For the model (D12) the interpretation of the historical trends is unreliable because of the collinearity. In model (D12) the influence of the father's and the mother's education decreases by -0.037 and -0.104 points, respectively. Their occupational influence decreases by -0.215 and -0.049 points, respectively. In the former case, the influence of the father decreases less quickly than the influence of the mother; for the latter we see the reverse, the influence of the father decreases more quickly than the influence of the mother. However, these numbers are misleading, because we have seen that the historical trend of the influence of social origin on children's status attainment, can be constrained to be the same for the mother and the father.

5. Conclusions and Discussion

Six separate hypotheses on how to model parental status background in educational attainment have been investigated in this article. The questions posed at the beginning can now be answered as follows. The best model to show how parents' socioeconomic status influences children's educational attainment is the Modified Dominance Model.

The status dominant parent, whether it is the mother or the father, is more influential than the non-dominant parent for the explanation of the children's educational level, but the non-dominant parent still counts. This pattern has remained the same over several decennia. Furthermore we have seen not only for the Modified Dominance Model, but also for the other models, that the historical trend of parental status transfer onto children's education is best modelled if the trends in the effects of the father and the mother are set equal to each other.

If we look in a more detailed way at the results, we see that some of the empirical models perform rather unsatisfactorily. For instance, the results for the Conventional Model indicate that neither only the father's background nor only the mother's background suffices to model the total transfer of parental status from one generation to the next. Therefore the Conventional Model's hypothesis can be rejected. Although the dominance approach, as Erikson (1984) proposes

it, is an improvement compared to the Conventional Model, it does not fit the data satisfactorily. The significantly inferior performance of the Conventional and the Dominance Models compared to the other models leads us to conclude that accounting for both parents' SES background in a study on status attainment is always superior compared to using only one of the parent's (usually the father's) status traits. The total influence of parents is underestimated if we use only one of the parents' SES background. Among the models that include both parents' SES, the Sex-Role Model, holding that the influence of the same-sex parent is higher than the influence of the different-sex parent, offers the least satisfactory solution. Little support is found to underline the expectation of a sex-role model regarding the educational attainment of children. Therefore, this model's hypothesis is not applicable to explain children's educational attainment.

Some other models perform more satisfactorily. The Modified Dominance Model that classifies the SES of both parents hierarchically (into a higher and lower status parent) fits the data best. Therefore, the initial assumption that the dominant parent determines the educational level of the child is in the right direction, but the rigidity of its implementation is incorrect. Our results have produced conclusive evidence for the argument that, within the family, the resources of the lower status parent are important for the educational attainment of children.

In the introduction we suggested that the mother's influence possibly has become more important in recent years, compared to that of the father. The tentative expectation was proposed that inclusions of mothers' status backgrounds perhaps lead to a correction of the previously established general trend towards less educational reproduction. No evidence is produced for this case. On the contrary, the historical trend of parental influence on the child's education is the same for the mother as it is for the father. A 'joined' trend measure for the father's and the mother's influence captures this development best. The Joined Model holds that mother's and father's status operate in an identical way. It is a good 'second best' solution to the leading Modified Dominance Model. If the status of the mother and the father differ, it seems to be the case that children are not unequivocally pulled towards the higher status parent's platform, but range somewhere between them. Otherwise Erikson's (1984) Dominance Model would have been the preferred solution, compared to the Joined Model.

The results for the Individual Model emphasize once again that both the mother's and the father's SES traits are important for the explanation of the child's educational attainment. Yet, the disadvantage of individually including the main effects *and* trends of the influence of both parents' educational and occupational background is that it becomes difficult to identify the underlying mechanisms, due to the collinearity of the coefficients. Consequently, the hypothesis of the individual model is, in the light of these outcomes, not supported. The mother's and the father's status background both count for the educational attainment of children, but we are unable to distinguish their influence in the Individual Model correctly.

A recommendation of which model to use might be expected at this point. If we work by backward induction, then several models surely cannot be recommended as they underestimate the relationship between social origin and the educational attainment of the children. As stated before, using both parents' socioeconomic background to study patterns of intergenerational status transfer is always superior. Among the models using both parents' status background, the Individual, or the Joined or the Modified Dominance Model all showed a sufficient measure of social origin.

Nevertheless, these three models have their advantages and disadvantages concerning their use. For instance, by using the Individual Model we are able to show the relative influence of the mother, compared to the father. *However*, if we also include the father and the mother's historical trends into the analysis, collinearity will distort our results. The Joined Model avoids collinearity, is easy to employ, and missing data for either the father or the mother pose less of a problem-which at times may be a large advantage. Therefore, it recommends itself for trend analysis. *However*, it shows only total parental influence; the individual contributions of the father and the mother cannot be compared. The same is true for the Modified Dominance Approach. This approach proved to be the best model for the impact of social origin on the education of the children. *However*, although being the best model it also requires that an occupational title be assigned to the respondent's mother. Considering the development of the employment rate of mothers, the Modified Dominance Model is best applied to more recent data. Older sets of data will probably include more homemaking mothers, making the implementation of this model more problematic. Consequently, a definite answer is dependent on the sort of question asked and the historical time covered by the data.

The mother's educational and occupational status have, net of the father's SES influence, considerable effects on the son's and daughter's educational attainment. Concerning trends of parental status transfer on the child's educational attainment it cannot be maintained that by adding the mother's influence, the directions of this trend changes. Still, the omission of either of the parent's characteristic as predictor produces a small but significant bias in the estimated trends in status reproduction. Therefore, it would be interesting to expand the survey window into the 1980's and extend the analysis to the child's first job. Furthermore, including more than three countries would offer insights into the question whether a general pattern has been discovered or whether in other countries other mechanisms apply. It also may be interesting to see whether the extent of status transfer among status homogeneous couples is higher than among couples that are not status homogeneous.

Appendix A. Coding of the Educational Level in the Netherlands, West Germany and USA

Years	The Netherlands (FAM 1993; HIN 1995)	West Germany (GLHS 1983, 1989)	USA (NSFH 1988)
6	lager onderwijs	Volksschule ohne Abschluß	Years of Formal Schooling
8		Volksschule ohne Abschluß mit Lehre	
9	lager beroepsonderwijs	Hauptschulabschluß ohne Lehre	
10	middelbaar voortgezet onderwijs	Mittlere Reife ohne Lehre	High School Equivalency Test (GED)
11	hoger voortgezet onderwijs	Hauptschulabschluß mit Lehre	
12	voorbereidend wetenschappelijk onderwijs	Mittlere Reife mit Lehre	
13	middelbaar beroepsonderwijs	Fachhochschulreife/ Abitur ohne Lehre	Years of Formal Schooling
14	hoger beroepsonderwijs	Fachhochschulreife/ Abitur mit Lehre	
17	doctoraal	Fachhochschulabschluß	
19	staatsexamen en promotie	Universitätsabschluß	

Appendix B. Abbreviations for Variables

Variablename	Explanation
MED	Mother's Education
MIS	Mother's Occupational ISEI Score
FED	Father's Education
FIS	Father's Occupational ISEI Score
HS_ED	Higher Status Parent's Education
HS_IS	Higher Status Parent's Occupational ISEI Score
LS_ED	Lower Status Parent's Education
LS_IS	Lower Status Parent's Occupational ISEI Score
FED = MED	Effects of Both Parents' Education are Constrained to be Equal
FIS = MIS	Effects of Both Parents' Occupation are Constrained to be Equal
SS_ED	Same-Sex Parent's Education
SS_IS	Same-Sex Parent's Occupational ISEI Score
DS_ED	Cross-Sex Parent's Education
DS_IS	Cross-Sex Parent's Occupational ISEI Score

Notes

1. In Germany teenagers usually enter vocational training after finishing school. If someone had completed vocational training ('Lehre') they received two additional years of schooling (see also: Blossfeld and Jaenichen 1990).
2. Considering the disadvantage that many times the mother's occupational status has a missing value (especially for the older cohorts) and models (B6) and (B13) require a valid entry for it, model (B7) often may be the more practical solution. In an analysis not shown here, we substituted a missing value of either parent with the other parent's valid entry and observed that the joined classification continued to fit the data better than either the conventional or Erikson's dominance approach (but not the modified dominance approach).

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